REMARKS

Applicant appreciates the courtesy of the Telephone Conference with Examiner Vazquez and the retraction of the Final rejection.

Applicant has further reviewed and amended the Claims consistent with the Interview to ensure that there is no remaining issue with regards to a positive recitation of the features of the present invention. Accordingly, the terminology "configured to" has been amended to assure the Examiner of the positive recitation of these features in interpreting our claims.

These amendments are not believed to introduce any new issues.

Our current claims are directed to instrumentation for measuring the properties of an insulating film of the type utilized, for example, in a plasma display panel manufactured by the present applicant under the trademark Panasonic. Applicant has found that by measuring the properties of the insulating film in, for example, a plasma display panel, such as magnesium oxide alone or with additives provided as a protective insulating film with charge retention capabilities, that an improved product can be economically manufactured.

Thus, the present invention enables applicant or others to measure the depositing of the magnesium oxide with charge retention capabilities for emitting secondary electrons in a plasma display panel.

As display panels have gotten larger, there has been additional demands made upon such products to conserve power and to reduce the generation of heat, while providing a sufficiently long life that is subject to a series of discharges with a capacity to erode the protective layer. The protective layer must maintain an acceptable charge to lower an applied voltage to the electrodes for writing an image pattern into an array of discharge cells.

By appropriately providing a protective layer of, for example, MgO, it is possible to maintain an acceptable charge while permitting a lowering of the applied voltage to the display panel electrodes while still maintaining a series of discharges necessary to provide the appropriate grayscale.

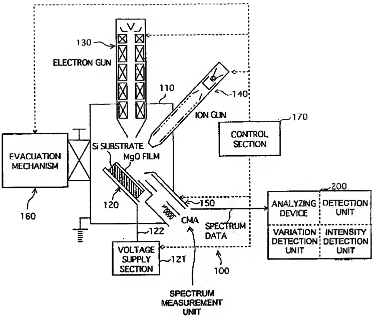
Our insulating film measuring device permits an evaluation of the properties of the insulating film by measuring a spectrum of secondary electrons emitted from the insulating film during an ion irradiation. We are also capable of measuring low energy level secondary electron peaks either during or after the ion irradiation, and we are further capable of correlating the properties of the insulating film to monitor secondary electrons from its valence bands to evaluate the resulting properties of the insulating film.

Our evaluation is effective as being an indicator for showing charge characteristics and valence band electron emission characteristics of the insulating film. See, for example, Page 16, Lines 7-17 of our specification.

As can be appreciated, by utilizing such an insulating film measuring device during the manufacturing of a display panel, an early determination of a proper depositing of the protective layer can help eliminate resultant finished defective products and thereby provide a favorable yield of a finished product at a cost savings.

Reference can be made to the schematic figure of our insulating film measuring device as follows:

FIG. 1



As can be determined, our voltage supply section 121 provides a predetermined negative voltage directly to the sample in order to accurately measure a rise position in the secondary electron spectrum. We are able to analyze peaks created due to the kinetically emitted secondary electrons, as shown for example in Figure 2. Additionally, as shown in Figures 3A-3C, we can measure the secondary electron peaks at a low energy region both during and after the ion beam irradiation. Accordingly, we can determine both an indication of the charge barrier stored on the surface of the insulating film and the form of the electron density of states in the valence bands of the insulating film.

As noted on Page 12, Lines 5-18, it is clear that our voltage supplying section 121 applies a prescribed negative voltage directly to the sample to provide a negative potential to the surface of the sample.

> Further, <u>the control section 170 causes the voltage applying section 121 to apply a prescribed negative voltage</u> (-25 V to -55 V) to the sample. <u>This has the effect of holding the surface of the sample at a negative potential</u>

> with respect to the various surrounding parts, including the vacuum vessel 110, the electron gun 130, the ion gun 140 and the electron spectrograph 150.
>
> Maintaining these conditions, the control section 170 causes either the electron gun 130 to irradiate the sample with electrons or the ion gun to irradiate the sample with inert gas positive ions, and causes the electron spectrograph 150 to operate.
>
> As ions or electrons collide with the surface of the sample, secondary electrons are emitted therefrom. <u>In order to accurately measure the rise position in the secondary electron spectrum at this time, a negative bias is applied to the sample</u>.

The Office Action has now rejected Claims 1-10, 13, 26-27 and 29-31 as being obvious over *Hamamura et al.* (U.S. Patent No. 6,303,932) in view of *Brust* (U.S. Patent No. 5,260,648).

Hamamura et al. had been previously cited for applying a vacuum to an insulating film and an ion irradiating unit irradiating argon ions, citing Column 14, Lines 18-22 in the prior Final Office Action.

The current Office Action rejection now relies upon Figure 1 and the teachings in Column 7, Lines 44-47, as noted on Page 2, Paragraph 3 of the Office Action as follows:

> ...the insulating film measuring device comprising an ion irradiating unit (2) configured to irradiate the insulating film (7) with ions (3); a voltage applying unit configured to apply a negative voltage (Column 7, Lines 44-46) to the insulating film (7) during ion irradiation...

The voltage applying unit relied upon in the Office Action rejection, however, is not applying a negative voltage to an insulating film during the ion irradiation as defined in our claims. Rather, the cited *Hamamura et al.* language actually refers to details of the positive ion beam supply means 20 which is disclosed on the right hand side of Figure 1 and more specifically, the only negative voltage is applied in the nozzle of the ion gun to the plasma. Material gas is supplied from the gas bomb from a flux variant valve or control means 28.

Supplementing the actual language cited in the Office Action rejection puts this teaching into further context, as follows:

> By applying a voltage which is negative against the plasma to the extracting electrode 250 of the positive ion beam supply means 20, positive ion beam 22 is obtained. This positive ion beam 22 is focused by lens 26 to coverage at the deflector 27 and is irradiated at a desired position on the surface of the specimen. And it is also possible to scan the positive ion beam 22 on the specimen 7 by deflector 27. (underline added)

As can be seen above, the extracting electrode 25 (not "250") actually creates a positive ion beam that scans the surface of the specimen.

It is respectfully submitted that the *Hamamura et al.* reference actually teaches away from applying a negative voltage to the surface of the specimen as set forth in our claims.

> "A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *In re Gurley,* 27 F.3d 551, 553 (Fed. Cir. 1994); *see KSR,* 127 S. Ct. at 1739-40 (explaining that when the prior art teaches away from a combination, that combination is more likely to be nonobvious). Additionally, a reference may teach away from a use when that use would render the result inoperable. *McGinley v. Franklin Sports, Inc.,* 262 F.3d 1339, 1354 (Fed. Cir. 2001).
>
> *In re Icon Health and Fitness, Inc.* 2007 U.S. App. Lexis 18244, *10

Certainly, if we utilize the rationale set forth in the Office Action, we would actually be providing a positive ion beam to be applied to our insulating film as a substitute for our negative voltage application, which could render our invention inoperative.

In summary, *Hamamura et al.* recites that "by applying a voltage which is negative against the plasma to the extracting electrode 25 of the positive ion beam supply means 20, positive ion beam 22 is obtained." This explains the inner construction of the ion beam supply means 20 in which the ion beam irradiates the specimen 7. Also, in *Hamamura et al.*, negative

voltage is applied to the extracting electrode 25 (see Figure 1). In other words, *Hamamura et al.* describes a common construction of a conventional ion irradiation beam.

The voltage applying unit of our claims applies a negative voltage to an insulating film that is a target for being irradiated with ions, and not to an electrode in the nozzle of an ion irradiation apparatus. Therefore, *Hamamura et al.* does not disclose the voltage applying unit configured to apply <u>a negative voltage to an insulator</u> that is a target for being irradiated with ions, as described in Claim 1 of the present application.

The *Brust* reference is directed to measuring an integrated circuit pattern to determine its performance. It has been known to use pins to contact various points in a highly integrated circuit pattern and apply a voltage to determine a voltage level and performance that can be found at other points on the circuit board. The *Brust* invention is also seeking to measure the performance of a high-integrated circuit but wishes to replace the conventional testing techniques by using a focused beam of ions or other particles including a laser or x-ray radiation, whereby the sample circuit would be irradiated by the primary beam to interact with the wiring pattern. A secondary signal is derived, which is indicative of the interaction.

Thus, the *Brust* reference purportedly taught an improvement in the prior art frequency range methods of frequency tracing and mapping. An output signal of a local oscillator of a spectrum analyzer, after undergoing a frequency conversion, is used to modulate a primary beam of energy to the circuit. The frequency to be analyzed is contained in a secondary signal which purportedly is easily detected at a low intermediate frequency range and can be displayed on a CRT.

In defining an invention, a difficulty arises in using a two-dimensional verbal definition to represent a three-dimensional invention. To provide protection to an inventor and notification

to the public, a proper interpretation of terms utilized in the claims must be adhered to in order to enable an appropriate evaluation of the invention and its scope relative to cited prior art.

Thus, not only should the concept of the invention be found in the prior art, but further, any cited structural elements in a prior art reference should be performing the same function with the same technical understanding to a person of ordinary skill in the field as the invention claims at issue.

It is respectfully submitted that the *Brust* reference does not teach the elements set forth in our claims, and the only rationale for combining these two references would be hindsight from our present application.

In the last line of Page 2 to Line 10 of Page 3 of the Office Action, the Office Action contends that *Brust* discloses "a spectrum measurement unit measuring a spectrum of secondary electrons emitted from the insulating film during ion irradiation and/or after ion irradiation has stopped." However, *Brust* does not disclose the construction described in the underlined part, since the target is not irradiated with ions.

Based on Figure 1 and the descriptions provided in Lines 61-64 of Column 2 and Lines 28-35 of Column 3 of *Brust*, iPE used to irradiate the target is a primary electron beam. Furthermore, the teaching disclosed by *Brust* is related to, as described in Lines 6-20 of Column 3, a so-called sampling technique for widening the measurement bandwidth of a detector that detects a secondary electron. Therefore, *Brust* is completely different from the technique applied to the invention of the present application.

The construction of Figure 4 pointed out by the Office Action, and the spectrum obtained by this construction, which is shown in Figures 6A and 6B, indicate that there have been detected (i) the signal frequency fs to be measured and (ii) the frequency component of the signal

frequency that has been shifted by fzf for sampling (see Column 3, Lines 39-57). This signal frequency fzf is a spectrum based on a signal generated by a first signal generator G1 in the measuring device disclosed in Figure 4, and not the spectrum of a secondary electron emitted from an insulator by irradiating a target with ions.

Brust does not disclose "a spectrum measurement unit measuring a spectrum of secondary electrons emitted from the insulating film during ion irradiation," which is a characteristic of Claim 1 of the present invention.

Claim 5 of the present application is also characterized by an ion irradiation unit irradiating the insulating film with ions, and a spectrum measurement unit configured to measure a spectrum of secondary electrons emitted from the insulating film after ion irradiation has stopped.

Thus, Claim 5 is focused on a new phenomenon in which secondary electrons are emitted from an insulator even after ion irradiation to the insulation film has stopped and as a result, the measurement (the spectrum of secondary electrons) is suitable for evaluating the secondary electron emission characteristics, etc., as described in the first embodiment of the specification of the present application.

Conversely, in the technique disclosed by *Brust*, it is a primary electron beam that irradiates the target, and not ions. Furthermore, there is no teaching that would indicate that "secondary electrons are emitted from an insulator after ion irradiation has stopped."

Therefore, neither *Hamamura et al.* nor *Brust* discloses "a spectrum measurement unit measuring a spectrum of secondary electrons emitted from the insulating film after ion irradiation has stopped" as described in Claim 5 of the present application. Hence, we believe that Claim 5 of the present application is non-obviousness.

Our discussion with Pinchus Laufer in the Office of Patent Legal Administration, who was involved in writing the Examination Guidelines for Determining Obviousness under 35 USC §103 in view of the Supreme Court decision in *KSR International Co. vs. Teleflex, Inc.* verified that the KSR decision still required a specific rationale that could not be based on hindsight for purportedly combining the elements in the prior art to meet an invention defined in the patent claims.

Mr. Laufer incorporated the following from the existing MPEP into the Guidelines.

As noted in the MPEP at §2143.02:

> A rationale to support a conclusion that a claim would have been obvious is that all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded nothing more than predictable results to one of ordinary skill in the art. *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, ___, 82 USPQ2d 1385, 1395 (2007); *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atlantic & P. Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950). (underline added)

Applicant submits that any combination of references that must be modified beyond their functions is suggestive of an unintended use of hindsight that may have been utilized to drive the present rejection. This is particularly true for an Examiner who is attempting to provide a diligent effort that only patentable subject matter occurs. The *KSR* Guidelines do not justify such an approach. There is still a requirement for the Examiner to step back from the zeal of the examination process and to appreciate that a Patent Examiner has to wear both hats of advocating a position relative to the prior art while at the same time objectively rendering in a judge-like manner a decision on the patentability of the present claims.

As set forth in MPEP 2142,

> To reach a proper determination under 35 U.S.C. §103, the examiner must step backward in time and into the shoes worn by the hypothetical "person of ordinary skill in the art" when the invention was unknown and just before it was made. In view of all factual information, the examiner must then make a determination whether the claimed invention "as a whole" would have been obvious at that time to that person. Knowledge of applicant's disclosure must be put aside in reaching this determination, yet kept in mind in order to determine the "differences," conduct the search and evaluate the "subject matter as a whole" of the invention. The tendency to resort to "hindsight" based upon applicant's disclosure is often difficult to avoid due to the very nature of the examination process. However, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

Accordingly, reviewing the functionality taught by *Hamamura et al.*, there is no teaching of a voltage applying unit to apply directly a negative voltage to the insulating film for the purpose of measuring a spectrum of secondary electrons emitted from the insulating film. Rather, *Hamamura et al.'s* teaching to a person of ordinary skill in this field would be to apply a positive flow of ions to the surface of a specimen.

This teaching not only would teach away from our present invention, it would also not produce an operative device when combined with the *Brust* teaching. The functioning described in *Brust* is to provide a sampling technique for a printed circuit pattern to detect a signal frequency with a shifted component of that frequency for sampling purposes. *Brust* not only does not supplement the deficiencies of the *Hamamura et al.* reference, but to a person of ordinary skill in the field, would not be teaching nor a suggestion of a measuring device for measuring the spectrum of a secondary electron emitted from an insulator of the type to be used in a plasma display panel.

Claim 9 of the present application is an insulating film measuring device for evaluating insulating film properties, and is characterized in that the insulating film measuring device

comprises: an ion irradiation unit configured to irradiate the insulating film with ions; and a spectrum measurement unit configured to measure while a negative voltage is being applied to the insulating film, a spectrum of secondary electrons emitted from the insulating film during ion irradiation and after the ion irradiation has stopped. A result of the measurement is suitable for evaluating the secondary electron emission characteristics, etc., as described in the first embodiment of the specification of the present application.

Conversely, *Hamamura et al.* does not disclose applying a negative voltage to an insulator that is targeted, and does not disclose measuring the secondary electron spectrum that is emitted by a target (insulator) being irradiated with ions.

Therefore, the characteristic of the spectrum measurement unit included in Claim 9 of the present application is not disclosed by either *Hamamura et al.* or *Brust.*

Claim 13 of the present application is an insulating film measuring method used for evaluating properties of an insulating film, and characterized in that the insulating film measuring method comprises: an ion irradiation step of irradiating the insulating film with ions; and a spectrum measurement step of measuring, at least one of during and after the ion irradiation, a spectrum of secondary electrons emitted from the insulating film while a negative voltage is applied to the insulating film.

As can be appreciated, the measurement steps set forth in Claim 13, like the apparatus claims mentioned above, would not be taught by either of the cited references of *Hamamura et al.* and *Brust*, and accordingly, it is believed that Claim 13, like the other claims, are in condition for allowance and an early notification of the same is requested.

If the Examiner believes a telephone interview will help further the prosecution of this case, the undersigned attorney can be contacted at the listed telephone number.

Very truly yours,

SNELL & WILMER L.L.P.

Joseph W. Price
Registration No. 25,124
600 Anton Boulevard, Suite 1400
Costa Mesa, CA 92626
Tel: 714-427-7420
Fax: 714-427-7799